DOCUMENT RESUME

ED 377 197 SP 035 737

TITLE	Qualifications of the Public School Teacher Workforce: 1988 and 1991. Statistical Analysis Report.
INSTITUTION	National Center for Education Statistics (ED), Washington, DC.
REPORT NO	ISBN-0-16-045436-0; NCES-95-665
PUB DATE	Dec 94
NOTE	43p.
AVAILABLE FROM	U.S. Government Printing Office, Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328.
PUB TYPE	Statistical Data (110) -- Reports - Research/Technical (143)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Educational Quality; *Intellectual Disciplines; *Misassignment of Teachers; *Public School Teachers; Secondary Education; Secondary School Students; *Secondary School Teachers; Statistical Analysis; *Teacher Certification; Teacher Characteristics; Teacher Education Programs; Teacher Effectiveness; *Teacher Qualifications
IDENTIFIERS	*Schools and Staffing Survey (NCES)

ABSTRACT

The quality of student/teacher interactions, in effect, the quality of learning, is greatly affected by the qualities (characteristics, qualifications, attitudes, and skills) of teachers. The Schools and Staffing Survey (SASS), conducted by the National Center for Educational Statistics, collected information that enables an analysis of teacher qualifications and the proportion of students being taught by less than fully qualified teachers. This document presents four analyses of teacher qualifications using data from the 1987-88 SASS and the 1990-91 SASS. All four analyses look at the interaction of academic preparation in the field taught and certification to teach in that field. The first two analyses focus on teachers' qualifications to teach in their main assignment field, or the field in which they teach the most classes, while the final two analyses focus on secondary teachers' qualifications to teach individual subjects they are assigned to teach during the school day. Each analysis then yields a table showing whether or not the teacher is certified in the field, and whether or not he or she has academic preparation in the field. Data for each of the four cells generated (certified, prepared; certified, not prepared; not certified, prepared; and not certified, not prepared) are provided. (LL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 377 197

SP

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

SP035737

BEST COPY AVAILABLE

NATIONAL CENTER FOR EDUCATION STATISTICS

Statistical Analysis Report December 1994

Qualifications of the Public School Teacher Workforce: 1988 and 1991

Sharon A. Bobbitt
Marilyn M. McMillen

U.S. Department of Education
Office of Educational Research and Improvement NCES 95-665

U.S. Department of Education
Richard W. Riley
Secretary

Office of Educational Research and Improvement
Sharon P. Robinson
Assistant Secretary

National Center for Education Statistics
Emerson J. Elliott
Commissioner

National Center for Education Statistics

"The purpose of the Center shall be to collect, analyze, and disseminate statistics and other data related to education in the United States and in other nations."—Section 406(b) of the General Education Provisions Act, as amended (20 U.S.C. 1221e–1).

December 1994

Contact:
Sharon A. Bobbitt
(202) 219–1461

For sale by the U.S. Government Printing Office
Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328
ISBN 0-16-045436-0

Contents

Introduction 1

Main assignment field 4

Each subject taught (secondary only) 8

Conclusion 11

Technical notes 23
- Introduction 23
- Survey response rates 23
- Item response rates 24
- Effects of item nonresponse 24
- Standard errors 24

Cautions concerning the measurement of change estimates using 1987-88 and 1990-91 SASS .. 25

Technical information about the SASS 25

Crosswalk between teaching assignments and major/minor fields of study 27

Definition of a teacher 29
- Secondary teachers 29

Acknowledgments 30

For more information 31

List of Tables

Table 1.--Percentage of public elementary and secondary school teachers by whether they are certified and/or have a college **major** in main assignment field, by field: 1988 and 1991 14

Table 2.--Percentage of public elementary and secondary school teachers by whether they are certified and/or have a college **major or minor** in main assignment field, by field: 1988 and 1991 15

Table 3.--Percentage of public secondary school **teachers** by whether they are certified and/or have a college major or minor in **subjects** they teach, by field: 1988 and 1991 16

Table 4.--Percentage of public secondary school **students** by whether they are taught by a teacher with full certification and/or a college major or minor in the **subjects**, by field: 1988 and 1991 17

Standard Error Tables

Table 1a.--Standard errors for percentage of public elementary and secondary school teachers by whether they are certified and/or have a college **major** in main assignment field, by field: 1988 and 1991 (table 1) 19

Table 2a.--Standard errors for percentage of public elementary and secondary school teachers by whether they are certified and/or have a college **major or minor** in main assignment field, by field: 1988 and 1991 (table 2) 20

Table 3a.--Standard errors for percentage of public secondary school **teachers** by whether they are certified and/or have a college major or minor in **subjects** they teach, by field: 1988 and 1991 (table 3) 21

Table 4a.--Standard errors for percentage of public secondary **students** by whether they are taught by a teacher with certification and/or a college major or minor in the **subjects**, by field: 1988 and 1991 (table 4) 22

List of Figures

Figure 1.--Percentage of public elementary and secondary school teachers with neither certification nor a college major in their main assignment field, by field: 1988 and 1991 6

Figure 2.--Percentage of public elementary and secondary school teachers with neither certification nor a college major or minor in their main assignment field, by field: 1988 and 1991 7

Figure 3.--Percentage of public secondary school teachers with neither certification nor a college major or minor in subjects they teach, by field: 1988 and 1991 10

Figure 4.--Percentage of public secondary school students taught by a teacher with neither certification nor a college major or minor in the subjects, by field: 1988 and 1991 12

Introduction

Teachers are at the heart of the educational system. With over 85 percent of our nation's children in public schools the critical role of public school teachers in education cannot be overemphasized. The quality of student/teacher interactions, in effect, the quality of learning, is greatly affected by the qualities (characteristics, qualifications, attitudes, and skills) of teachers. But an analysis of the overall quality of teaching and learning involves looking at both the skills and abilities of the teacher and at student performance. Ideally, we would like to know how many excellent and poor teachers are in public school classrooms, and the effect these teachers have on student performance. The definition and measurement of teacher quality is problematic[1], however, and national data currently available do not link teacher quality to student performance. Instead, the data allow us to analyze teacher qualifications based upon academic preparation and professional certification, an imperfect and indirect indicator of teacher quality, and to look at the numbers of students taught by teachers without academic preparation or certification ("less than fully qualified teachers"). Clearly, measurements of qualifications such as certification and degree attainment do not necessarily identify the excellent and poor teachers. But when analyzed in conjunction with teachers' fields of assignment, these measures of teacher qualifications reflect a level of knowledge and skills that most would agree is the necessary prerequisite to becoming a qualified teacher. And while these data cannot be used to assess the impact of out-of-field teaching on student performance, they can be used to estimate the numbers of students taking

[1] For a discussion see Bobbitt, Quinn, and Dabbs, "Filling the Gaps: An Overview of Data on Education in Grades K through 12," NCES 92-132, November 1992, and Ingersoll, Richard M., "National Assessments of Teacher Quality," NCES, forthcoming.

specialized courses at the secondary level who are being taught by teachers without the most minimal academic preparation in the subject, such as a college minor degree.

The Schools and Staffing Survey (SASS), conducted by the National Center for Education Statistics, collected information that enables an analysis of teacher qualifications and the proportion of students being taught by less than fully qualified teachers. In the area of teacher background qualifications, the SASS collected data on all degrees earned (from associate's to doctorate), the subject field of these earned degrees, whether teachers were certified in their fields of assignment, and the type of certification they held in those fields. In the area of teacher assignments, the survey collected data on main and secondary subject fields of assignment, and, for secondary school teachers, on the subject fields they taught for each period of the school day, along with the number of students in each class. With the combination of the background qualifications and the teacher assignment information, data from the 1987-88 SASS and the 1990-91 SASS can inform questions about teachers' qualifications to teach in their assigned fields, and the numbers of students taught by teachers with different levels of qualifications[2].

The discussion below presents four analyses of teacher qualifications using the Schools and Staffing Survey. Each analysis differs slightly in the focus it brings to the issue of teacher qualifications in assigned fields. All four analyses look at the interaction of academic preparation in the field taught and certification to teach in that field. The first two analyses focus on teachers' qualifications to teach in their main assignment field, or the field in which they teach the most classes, while the final two analyses focus on secondary teachers' qualifications to teach individual

[2] A forthcoming NCES report by Jay Chambers and Richard Ingersoll, tentatively entitled "Teacher Supply, Demand, and Quality: National Data 1990-91" will take the analyses presented here and expand them to look at the types of teachers who teach out of field and the types of schools in which out-of-field teachers teach.

subjects they are assigned to teach during the school day. Each analysis then yields a table showing whether or not the teacher is certified in the field, and whether or not he or she has academic preparation (college major or college major/minor) in the field. The analyses are as follows:

Table 1) Are teachers certified in their main assignment field?

Did teachers major in their main assignment field?

Table 2) Are teachers certified in their main assignment field?

Did teachers major or minor in their main assignment field?

Table 3) Are secondary teachers certified to teach in the individual subjects they are assigned?

Did teachers major or minor in the individual subjects they are assigned?

Table 4) Are students in secondary classes taught by teachers certified to teach in the subject?

Are students in secondary classes taught by teachers with a major or minor in the subject?

Each of these analyses provides a different window onto the subject of teacher qualifications and out-of-field teaching. The first two analyses may underestimate the extent of out-of-field teaching, because they assess teachers' qualifications to teach in their main assignment field. Presumably, most if not all public school teachers will report they have qualifications to teach the field in which they teach the most classes. Of the first two analyses, the first should show more out of field teaching than the second, because while the first requires a matching major degree to meet the criterion of academic preparation, the second also permits a matching minor

degree. The third analysis may overestimate the amount of out-of-field teaching, because it looks at the percent of teachers who are not fully qualified to teach any one of the classes that they are assigned during the school day. For example, the third analysis will assess the percentage of teachers teaching at least one science class who have neither majored/minor nor are certified in science. Because this type of out-of-field teaching may occur only for a very few periods per day, and because these classes taught by out-of-field teachers may, in fact, be smaller and involve fewer students, the final analysis will look at the numbers of secondary students in specific subjects taught by teachers without minimal preparation in those subjects.

Although the tables presented at the end of this paper show the results for each of the four cells generated from each of these analyses (certified, prepared; certified, not prepared; not certified, prepared; not certified, not prepared), the text and the figures tend to focus on one cell which measures the extent of out-of-field teaching--the percent of teachers with neither academic preparation nor full certification in their field, and the numbers of students in classes taught by such teachers.

Main assignment field

A teacher's main assignment field is the field in which they teach the most classes[3]. We would therefore expect teachers to hold the highest level of qualifications in this field. Indeed, we would expect teachers to be fully certified[4] as well as have a college major[5] in this field[6]. And, in

[3] Most elementary school teachers have a main assignment field of "general elementary." Some elementary level teachers are subject specialists and have a main assigment field corresponding to their field of specialty.

[4] Holding an advanced, standard, or probationary certificate, but excluding emergency certificates.

[5] At the bachelor's degree level or higher.

fact, these data yield a positive view. About 93 percent of all K-12 teachers in selected fields[7] reported some form of certification in their main assignment field in 1988 and about 95 percent reported full certification in 1991 (table 1). The difference in the percentage of teachers with full certification between 1988 and 1991 represents a statistically significant increase in the percentage of fully certified teachers. An additional 4.5 percent in 1988 and 2.7 percent in 1991 reported that they had a major in this field but were not certified. The percentage of teachers with neither a major nor any certification in their main assignment field was relatively small for all fields in both years, ranging from 5.8 percent in mathematics (1988) to one-half of one percent in arts/music (1988) (figure 1). And, while this varied somewhat by teaching field, in only one field in each year (mathematics in 1988 and special education in 1991) was the percentage of teachers with neither a college major nor full certification greater than 5 percent (figure 1).

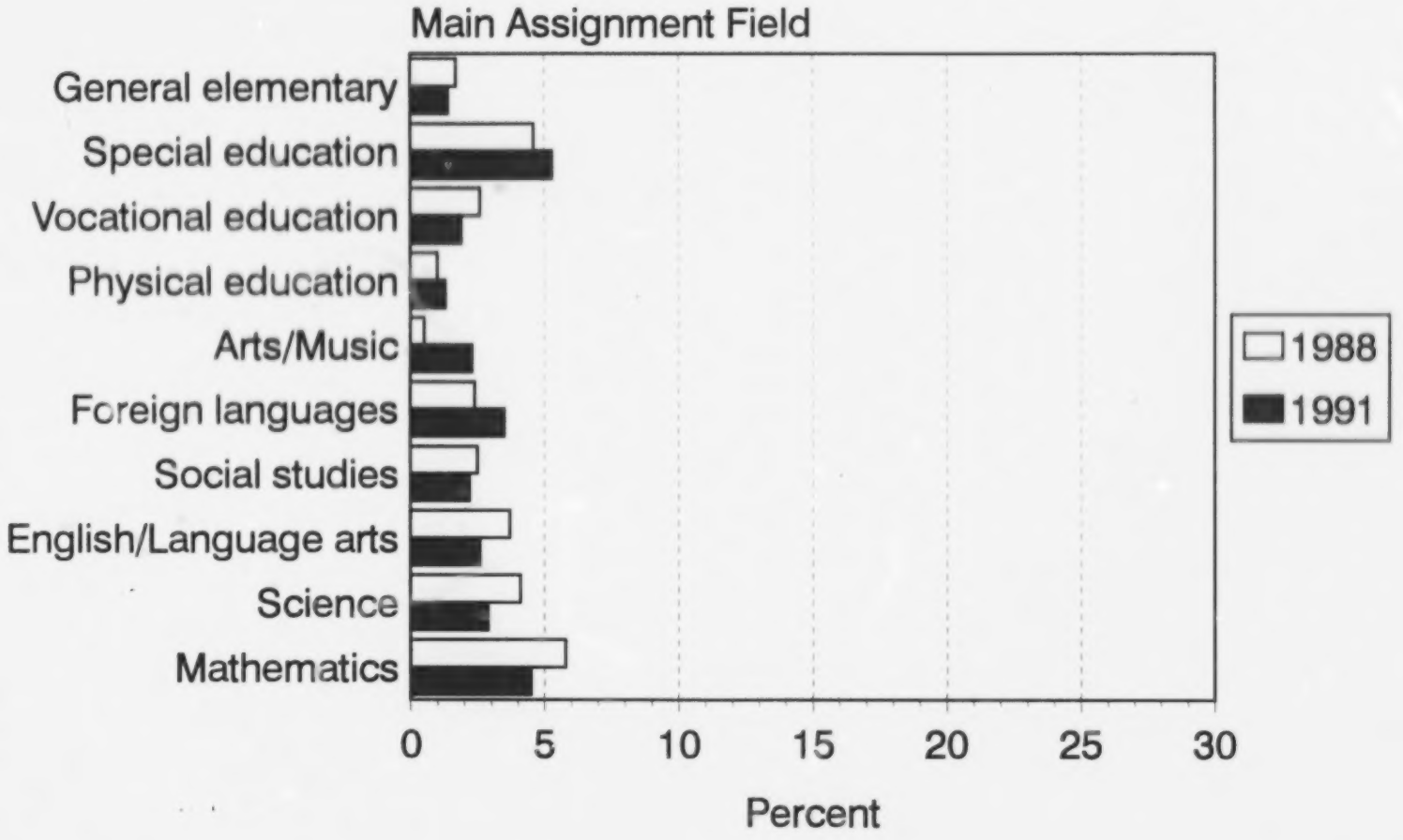
Yet teachers who did not major in the subject field of their main teaching assignment may feel that they are nonetheless qualified to teach in that field as a result of having completed a minor program of study at the bachelor's degree level or higher. When minor degrees were included in the analysis, the overall percentage of teachers who had neither full certification nor a major or minor degree in their main field of assignment dropped to 1.2 percent in 1988 and to

---

[6] The crosswalk between teacher's assignment and major or minor field of study is shown in the technical notes. For each field, both subject fields and education majors and minors are considered matches to an assignment. For example, a teacher who majored in mathematics or mathematics education would be considered a match to a mathematics assignment.

[7] This total includes only teachers whose main assignment was in general elementary, prekindergarten, kindergarten, special education, vocational education, physical education, arts/music, foreign languages, social studies, English/ language arts, science, and mathematics.

Figure 1.--Percentage of public elementary and secondary school teachers with neither certification nor a college major in their main assignment field, by field: 1988 and 1991



SOURCE: National Center for Education Statistics, Schools and Staffing Survey, 1988 and 1991

2 percent in 1991, with the percentages in each of the specific fields dropping (table 1 and figure 1 versus table 2 and figure 2). For example, the percentage of mathematics teachers with neither a major nor full certification in mathematics in 1988 dropped from 5.8 percent (minors not included) to 3.8 percent (minors included) and the corresponding percentages for special education in 1991 dropped from 5.3 percent to 4.1 percent.

For the remainder of this report, the analyses will focus on whether secondary teachers in departmentalized classes have full certification in each subject they are assigned to teach during the school day. These analyses evaluate academic preparation in the assigned field by whether teachers have a major or a minor in those fields.

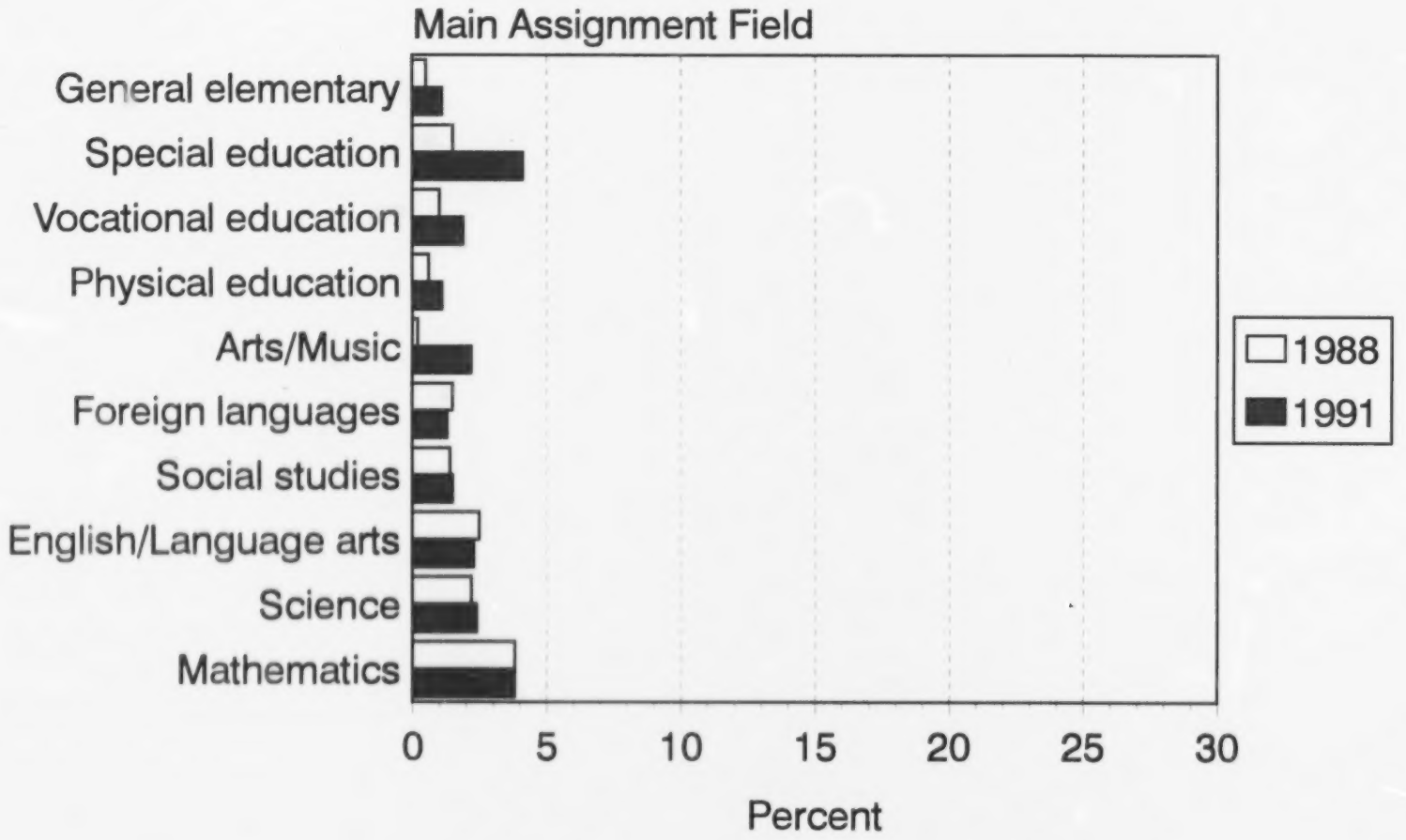
Each subject taught (secondary only)[8]

In practice, many teachers' classroom responsibilities include subject matter fields beyond their main assignment fields. Although a number of teachers are certified in more than one field (7.7 percent) and some teachers have majors or minors that encompass more than one field, it remains the case that many secondary teachers teach one or more classes "out-of-field." The profile of teacher qualifications changes when each teacher's training and certification are matched to each actual class assignment for each period of the day.

An analysis of the qualifications of all secondary teachers who teach at least one class in specific subjects showed that the percent of teachers who were certified to teach in those subjects varied by subject. In 1988, only 71.1 percent of the teachers who taught at least one mathematics class were certified to teach mathematics, but 86.1 percent of the teachers who

[8] See the technical notes for a definition of "Secondary."

Figure 2.--Percentage of public elementary and secondary school teachers with neither certification nor a college major or minor in their main assignment field, by field: 1988 and 1991



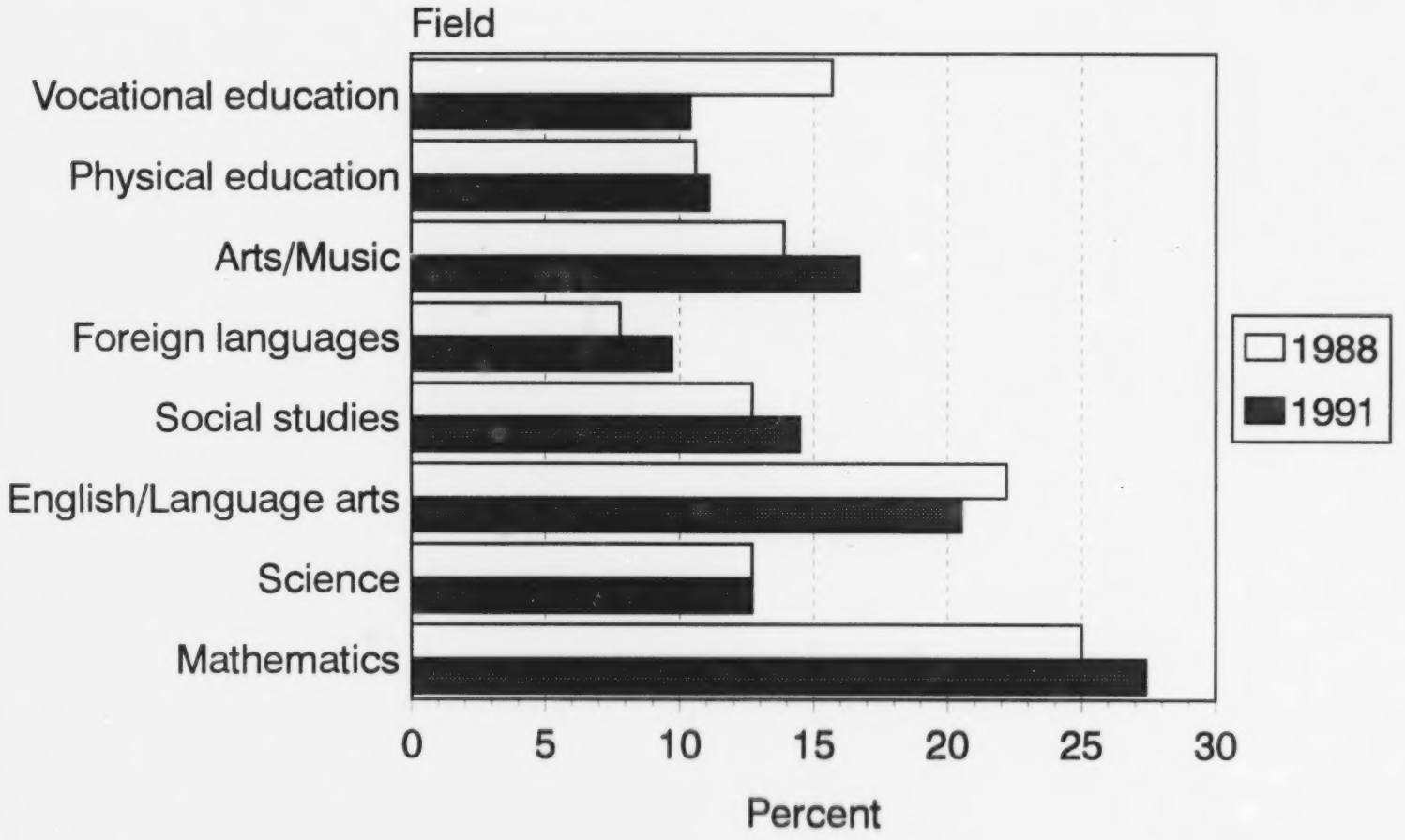
SOURCE: National Center for Education Statistics, Schools and Staffing Survey, 1988 and 1991

taught at least one foreign language class were certified to teach foreign languages (table 3). The picture remained mixed in 1991, with percentages of certified teachers for each field taught ranging from 67.1 for mathematics to 84.3 for vocational education.

An even more interesting picture emerges when we examine the percentage of teachers who taught at least one section of these courses who were neither certified nor had a major or minor in these fields. In 1988 and 1991, about one-quarter of public school teachers who taught at least one mathematics class were neither certified nor had a major or minor in mathematics (figure 3). Furthermore, in both years about 20 percent of teachers who taught at least one section of English/language arts lacked these basic qualifications. The best picture emerges for foreign languages, where 7.8 percent in 1988 and 9.7 percent in 1991 of teachers who taught at least one class of foreign languages were neither certified nor had a major or minor in foreign languages. Of course, the impact of differing levels of teacher qualifications on numbers of students depends both on the number of classes each "out-of-field" teacher teaches and also on the size of those classes.

The number of students taught by less-than-fully-qualified teachers can be considered by analyzing teacher reports of the number of students enrolled in each class period throughout the week. When this is juxtaposed against teacher qualifications, we find that 70 percent or more of all students in 1988 and 1991 in vocational education, physical education, arts/music, foreign languages, social studies, English/ language arts and science classes have teachers who report both a college major/minor and full certification in the field being taught; in both years the percent of students in mathematics classes taught by these most qualified teachers was between 65 and 70 percent.

Figure 3.--Percentage of public secondary school teachers with neither certification nor a college major or minor in subjects they teach, by field: 1988 and 1991



SOURCE: National Center for Education Statistics, Schools and Staffing Survey, 1988 and 1991

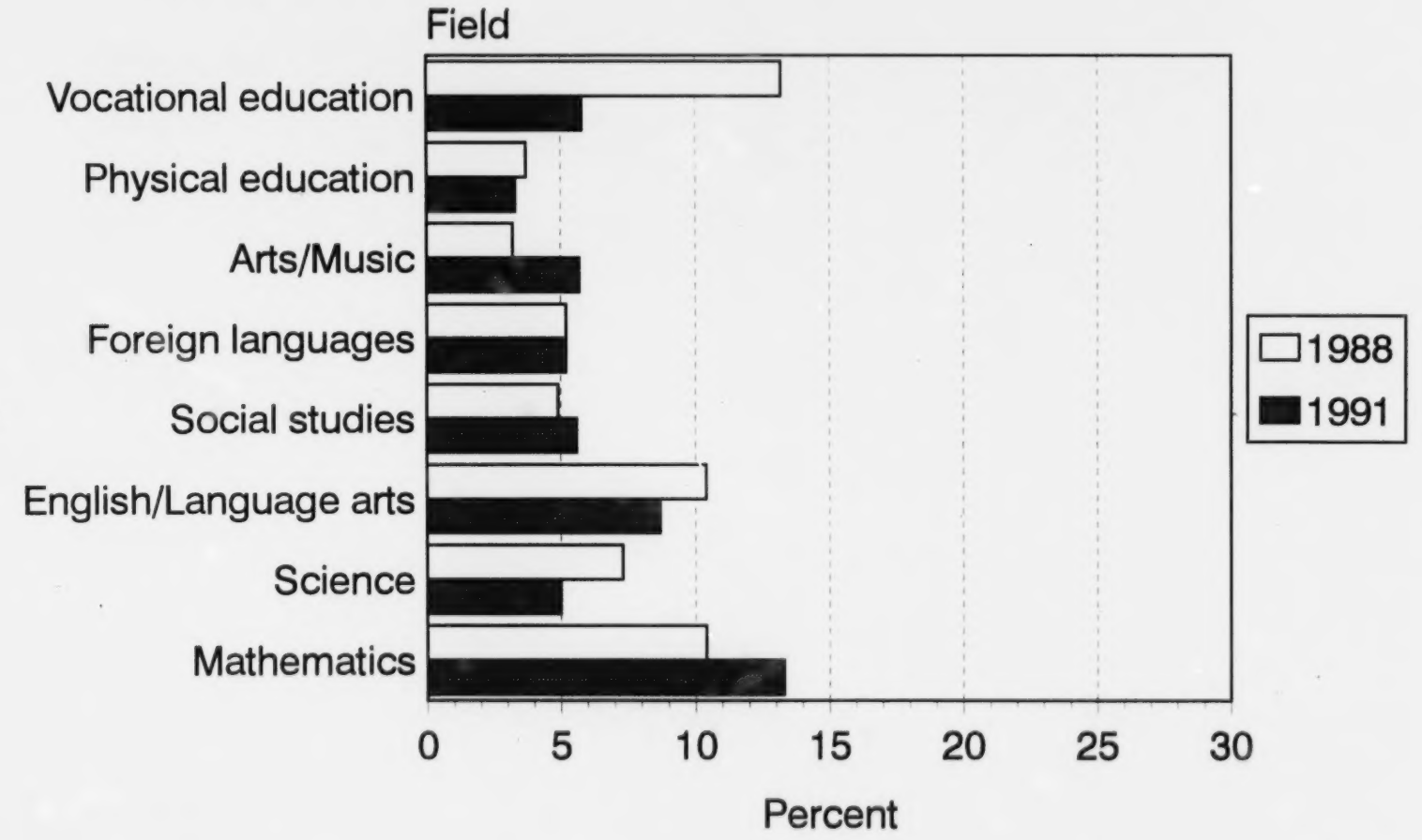
Comparisons of the percent of students taught by teachers with both full certification and a college major or minor in the subject taught (table 4) with the percent of the subject matter teaching force with full certification and a college major or minor (table 3) show somewhat higher percentages for students than teachers. This suggests that the most qualified (i.e. certified and majors/minors) teachers are more likely to teach more classes, or at least more students than teachers with lower levels of qualifications.

The converse is seen when data for the percent of students taught by teachers with neither full certification nor a major or minor (figure 4) are compared to the percent of teachers without these minimal qualifications in a particular field (figure 3). There we can see that relatively smaller proportions of students are involved than teachers, for example, while 27 percent of the secondary math teachers in 1991 reported neither certification nor a major or minor in mathematics, only 13 percent of all mathematics students were taught by these teachers.

Conclusion

The conclusions reached concerning the qualification levels of the U.S. teaching force vary markedly with the definitions of qualification levels. If the focus is restricted to main assignment field contrasted against teachers' college major and certification status, the profile is one of a highly qualified work force, with almost 95 percent of all K-12 teachers reporting some form of certification and another 3 to 5 percent reporting a college major in their main assignment field. In contrast, when the focus shifts to include all the classes taught by each teacher the profile changes, showing 70 to 90 percent of the teachers reporting full certification in each class subject they are assigned to teach during the school day. If the focus is narrowed

Figure 4.-- Percentage of students of public secondary teachers taught by a teacher with neither certification nor a major or minor in the subjects: 1988 and 1991



SOURCE: National Center for Education Statistics, Schools and Staffing Survey, 1988 and 1991

even further to teachers who are both fully certified and hold a major/minor in the field taught, the profile changes again; with less than 60 percent of all teachers with one or more English/language arts classes and mathematics classes reporting both a college major/minor and full certification in those teaching fields in both 1988 and 1991. In the case of mathematics, only 66 percent of mathematics students have fully certified mathematics teachers who majored or minored in mathematics. In fact, a full 10 to 13 percent of students in mathematics classes are taught by teachers who are not fully certified to teach mathematics and did not major or minor in mathematics. In other subjects, however, the picture is not nearly as bleak. Only about 3 to 5 percent of students in physical education, arts/music, foreign language, or social studies classes are taught by teachers without minimal qualifications (not certified, no major or minor) in those fields.

In examining the qualifications of the teaching force in our Nation's public schools, it is clearly important to look beyond the qualifications for the field in which the teacher teaches the most classes, and also to examine the numbers of students taught by less than fully qualified teachers who teach one or more classes out of their field. To a certain extent, the issue of out-of-field teaching is not just one of teacher preparation, but also of teacher utilization. Schools and school districts ultimately make the decision that a teacher who is less than fully qualified will teach a subject to certain students for a certain number of periods each day. The challenge to educators is not only to ensure a good match between qualifications and teacher assignments, but also to look beyond teacher qualifications (which comprise minimal requirements for teaching effectiveness) towards teacher quality, in order to ensure the highest quality education for the over 40 million children in public education in this country. Future research on this topic not only

needs to further our understanding and measurement of teacher quality, but also to assess the impact on student performance of both high quality teaching and out-of field teaching.

Table 1.- -Percentage of public elementary and secondary school teachers by whether they are certified and/or have a college **major** in main assignment field, by field: 1988 and 1991

Main assignment field	Certified			Not certified		
	Total	Major	No major	Total	Major	No major
			1987-88			
Total*	92.9	71.6	21.2	7.1	4.5	2.6
General elementary, preK, kindergarten	92.5	77.8	14.7	7.5	5.8	1.7
Special education	89.5	64.3	25.1	10.5	6.0	4.6
Vocational education	95.1	71.1	24.0	4.9	2.3	2.6
Physical education	94.5	84.8	9.7	5.5	4.5	1.0
Arts/Music	95.6	87.4	8.1	4.4	4.0	0.5
Foreign languages	93.8	75.6	18.3	6.2	3.8	2.4
Social studies	94.8	67.9	26.9	5.2	2.7	2.5
English/Language arts	93.8	58.9	34.9	6.2	2.4	3.7
Science	91.9	60.9	30.9	8.1	4.0	4.1
Mathematics	91.6	53.3	38.4	8.4	2.6	5.8
			1990-91			
Total*	94.8	72.8	22.0	5.2	2.7	2.5
General elementary, preK, kindergarten	96.0	80.9	15.1	4.0	2.6	1.4
Special education	89.9	66.0	24.0	10.1	4.7	5.3
Vocational education	96.0	79.4	16.7	4.0	2.1	1.9
Physical education	96.1	88.1	8.0	3.9	2.6	1.3
Arts/Music	95.5	76.2	19.3	4.5	2.2	2.3
Foreign languages	93.3	72.3	21.0	6.7	3.1	3.5
Social studies	95.0	68.8	26.2	5.0	2.8	2.2
English/Language arts	95.6	58.0	37.7	4.4	1.7	2.6
Science	94.4	61.2	33.3	5.6	2.6	2.9
Mathematics	93.4	51.3	42.2	6.6	2.1	4.5

* Selected fields.

Table reads: In school year 1990-91, 4.5 percent of all public elementary and secondary teachers whose main assignment field was mathematics were neither certified nor had a major in mathematics or mathematics education.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987-88 and 1990-91.

Table 2.- -Percentage of public elementary and secondary school teachers by whether they are certified and/or have a college **major or minor** in main assignment field, by field: 1988 and 1991

Main assignment field	Certified			Not certified		
	Total	Major/ minor	No major/ minor	Total	Major/ minor	No major/ minor
1987-88						
Total*	92.9	71.6	21.2	7.1	5.9	1.2
General elementary, preK, kindergarten	92.5	77.8	14.7	7.5	7.0	0.5
Special education	89.5	64.3	25.1	10.5	9.1	1.5
Vocational education	95.1	71.1	24.0	4.9	3.9	1.0
Physical education	94.5	84.8	9.7	5.5	4.9	0.6
Arts/Music	95.6	87.4	8.1	4.4	4.2	0.2
Foreign languages	93.8	75.6	18.3	6.2	4.6	1.5
Social studies	94.8	67.9	26.9	5.2	3.8	1.4
English/Language arts	93.8	58.9	34.9	6.2	3.7	2.5
Science	91.9	60.9	30.9	8.1	5.9	2.2
Mathematics	91.6	53.3	38.4	8.4	4.6	3.8
1990-91						
Total*	94.8	80.4	14.4	5.2	3.2	2.0
General elementary, preK, kindergarten	96.0	85.2	10.8	4.0	2.9	1.1
Special education	89.9	75.4	14.5	10.1	6.0	4.1
Vocational education	96.0	82.1	13.9	4.0	2.1	1.9
Physical education	96.1	91.4	4.7	3.9	2.8	1.1
Arts/Music	95.5	79.5	16.0	4.5	2.3	2.2
Foreign languages	93.3	85.8	7.6	6.7	5.4	1.3
Social studies	95.0	82.3	12.7	5.0	3.5	1.5
English/Language arts	95.6	72.4	23.3	4.4	2.0	2.3
Science	94.4	74.6	19.9	5.6	3.1	2.4
Mathematics	93.4	65.0	28.5	6.6	2.9	3.8

* Selected fields.

Table reads: In school year 1990-91, 3.8 percent of all public elementary and secondary teachers whose main assignment field was mathematics were neither certified nor had a major or minor in mathematics or mathematics education.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987-88 and 1990-91.

Table 3.- -Percentage of public secondary school **teachers** by whether they are certified and/or have a college major or minor in **subjects** they teach, by field: 1988 and 1991

Subject taught	Certified			Not certified		
	Total	Major/ minor	No major/ minor	Total	Major/ minor	No major/ minor
1987-88						
Vocational education	80.9	67.5	13.4	19.1	3.4	15.7
Physical education	82.8	77.5	5.2	17.2	6.6	10.6
Arts/Music	80.0	76.8	3.2	20.0	6.2	13.9
Foreign languages	86.1	79.6	6.5	13.9	6.1	7.8
Social studies	81.3	70.1	11.3	18.7	6.0	12.7
English/Language arts	73.4	58.6	14.8	26.6	4.4	22.2
Science	81.9	67.7	14.2	18.1	5.3	12.7
Mathematics	71.1	55.8	15.4	28.9	3.9	25.0
1990-91						
Vocational education	84.3	76.3	8.0	15.7	5.3	10.4
Physical education	73.5	69.9	3.6	26.5	15.4	11.1
Arts/Music	78.0	67.2	10.8	22.0	5.3	16.7
Foreign languages	75.7	70.6	5.1	24.3	14.6	9.7
Social studies	72.5	65.5	7.0	27.5	12.9	14.5
English/Language arts	72.1	59.8	12.3	27.9	7.4	20.5
Science	79.4	67.6	11.7	20.6	7.9	12.7
Mathematics	67.1	53.6	13.6	32.9	5.5	27.4

Table reads: Of all public secondary teachers teaching at least one class of mathematics in school year 1990-91, 27.4 percent were neither certified nor had a major or minor in mathematics or mathematics education.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987-88 and 1990-91.

Table 4.- -Percentage of public secondary school **students** by whether they are taught by a teacher with certification and/or a college major or minor in the **subjects**, by field: 1988 and 1991

Subject taught	Certified			Not certified		
	Total	Major/ minor	No major/ minor	Total	Major/ minor	No major/ minor
1987-88						
Vocational education	83.4	70.2	13.2	16.6	3.4	13.2
Physical education	92.0	86.8	5.2	8.0	4.3	3.7
Arts/Music	89.5	88.3	1.3	10.4	7.2	3.2
Foreign languages	88.8	81.8	7.0	11.2	6.0	5.2
Social studies	91.2	80.8	10.4	8.8	3.9	4.9
English/Language arts	86.2	70.2	16.0	13.8	3.4	10.4
Science	87.7	73.8	13.9	12.3	5.0	7.3
Mathematics	85.1	68.5	16.6	14.9	4.5	10.4
1990-91						
Vocational education	90.7	82.5	8.2	9.3	3.5	5.8
Physical education	88.4	84.5	3.8	11.6	8.3	3.3
Arts/Music	91.2	77.1	14.1	8.8	3.2	5.7
Foreign languages	87.0	80.0	7.0	13.0	7.8	5.2
Social studies	87.1	78.8	8.3	12.9	7.2	5.6
English/Language arts	86.7	72.2	14.5	13.3	4.6	8.7
Science	89.5	76.6	12.9	10.5	5.5	5.0
Mathematics	82.6	66.1	16.5	17.4	4.1	13.3

Table reads: Of all public school students taking secondary mathematics in school year 1990-91, 13.3 percent were taught by teachers who were neither certified nor had a major or minor in mathematics or mathematics education.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987-88 and 1990-91.

Table 1a.- -Standard errors for percentage of public elementary and secondary school teachers by whether they are certified and/or have a college **major** in main assignment field, by field: 1988 and 1991 (table 1)

Main assignment field	Certified			Not certified		
	Total	Major	No major	Total	Major	No major
			1987-88			
Total*	0.23	0.38	0.38	0.23	0.18	0.11
General elementary, preK, kindergarten	0.39	0.51	0.45	0.39	0.34	0.16
Special education	0.67	1.24	1.16	0.67	0.52	0.47
Vocational education	0.44	0.75	0.81	0.44	0.37	0.28
Physical education	0.70	1.11	0.89	0.70	0.62	0.29
Arts/Music	0.64	1.25	0.94	0.64	0.67	0.15
Foreign languages	0.94	1.99	1.72	0.94	0.69	0.82
Social studies	0.54	1.19	1.12	0.54	0.46	0.41
English/Language arts	0.53	1.13	1.05	0.53	0.35	0.47
Science	0.66	1.34	1.17	0.66	0.43	0.51
Mathematics	0.75	1.24	1.16	0.75	0.39	0.69
			1990-91			
Total*	0.20	0.39	0.35	0.20	0.13	0.15
General elementary, preK, kindergarten	0.28	0.67	0.56	0.28	0.19	0.20
Special education	0.77	1.11	1.04	0.77	0.51	0.52
Vocational education	0.40	0.95	0.81	0.40	0.26	0.30
Physical education	0.70	1.05	0.65	0.70	0.54	0.52
Arts/Music	0.94	1.27	1.34	0.94	0.65	0.63
Foreign languages	1.60	2.51	2.19	1.60	0.69	1.43
Social studies	0.67	1.30	1.21	0.67	0.51	0.44
English/Language arts	0.50	0.94	0.97	0.50	0.22	0.44
Science	0.59	1.64	1.66	0.59	0.40	0.47
Mathematics	0.77	1.07	1.11	0.77	0.43	0.60

* Selected fields.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987-88 and 1990-91.

Table 2a.- -Standard errors for percentage of public elementary and secondary school teachers by whether they are certified and/or have a college **major or minor** in main assignment field, by field: 1988 and 1991 (table 2)

Main assignment field	Certified			Not certified		
	Total	Major	No major	Total	Major	No major
			1987-88			
Total*	0.23	0.38	0.38	0.23	0.22	0.08
General elementary, preK, kindergarten	0.39	0.51	0.45	0.39	0.38	0.08
Special education	0.67	1.24	1.16	0.67	0.65	0.25
Vocational education	0.44	0.75	0.81	0.44	0.44	0.23
Physical education	0.70	1.11	0.89	0.70	0.66	0.24
Arts/Music	0.64	1.25	0.94	0.64	0.67	0.08
Foreign languages	0.94	1.99	1.72	0.94	0.60	0.76
Social studies	0.54	1.19	1.12	0.54	0.49	0.34
English/Language arts	0.53	1.13	1.05	0.53	0.40	0.37
Science	0.66	1.34	1.17	0.66	0.50	0.46
Mathematics	0.75	1.24	1.16	0.75	0.49	0.66
			1990-91			
Total*	0.20	0.33	0.26	0.20	0.14	0.13
General elementary, preK, kindergarten	0.28	0.60	0.47	0.28	0.22	0.19
Special education	0.77	1.15	0.93	0.77	0.57	0.43
Vocational education	0.40	0.19	0.78	0.40	0.26	0.31
Physical education	0.70	0.95	0.55	0.70	0.55	0.50
Arts/Music	0.94	1.22	1.14	0.94	0.66	0.62
Foreign languages	1.60	1.85	1.04	1.60	1.51	0.41
Social studies	0.67	1.06	0.91	0.67	0.53	0.36
English/Language arts	0.50	1.08	1.06	0.50	0.25	0.46
Science	0.59	1.41	1.38	0.59	0.43	0.47
Mathematics	0.77	1.30	1.38	0.77	0.49	0.58

* Selected fields.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987-88 and 1990-91.

Table 3a.- -Standard errors for percentage of public secondary school teachers by whether they are certified and/or have a college major or minor in **subjects** they teach, by field: 1988 and 1991 (table 3)

Subject taught	Certified			Not certified		
	Total	Major/ minor	No major/ minor	Total	Major/ minor	No major/ minor
			1987-88			
Vocational education	0.78	0.93	0.69	0.78	0.39	0.81
Physical education	1.06	1.21	0.62	1.06	0.73	0.88
Arts/Music	1.68	1.61	0.59	1.68	1.09	1.44
Foreign languages	1.17	1.60	1.25	1.17	0.77	0.94
Social studies	0.95	1.27	0.86	0.95	0.61	0.74
English/Language arts	0.96	0.95	0.70	0.96	0.43	0.86
Science	0.94	1.21	0.82	0.94	0.56	0.85
Mathematics	1.04	1.20	0.81	1.04	0.46	0.97
			1990-91			
Vocational education	0.72	0.85	0.69	0.72	0.49	0.62
Physical education	1.36	1.38	0.58	1.36	1.07	0.84
Arts/Music	1.52	1.76	0.86	1.52	0.65	1.47
Foreign languages	1.85	2.18	0.84	1.85	1.45	1.24
Social studies	1.06	1.07	0.62	1.06	0.87	0.78
English/Language arts	1.10	1.25	0.70	1.10	0.60	1.05
Science	0.95	1.33	1.08	0.95	0.62	0.80
Mathematics	0.75	1.00	0.73	0.75	0.51	0.74

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987-88 and 1990-91.

Table 4a.- -Standard errors for percentage of public secondary **students** by whether they are taught by a teacher with certification and/or a college major or minor in the **subjects,** by field: 1988 and 1991 (table 4)

Subject taught	Certified			Not certified		
	Total	Major/ minor	No major/ minor	Total	Major/ minor	No major/ minor
			1987-88			
Vocational education	0.88	0.93	0.78	0.88	0.53	0.86
Physical education	1.00	1.15	0.80	1.00	0.84	0.46
Arts/Music	1.19	1.25	0.72	1.19	1.13	0.64
Foreign languages	1.40	2.22	1.62	1.40	0.96	0.89
Social studies	0.69	1.12	0.89	0.69	0.59	0.44
English/Language arts	0.79	0.97	0.88	0.79	0.41	0.64
Science	0.83	1.16	0.90	0.83	0.67	0.63
Mathematics	0.92	1.33	1.00	0.92	0.62	0.81
			1990-91			
Vocational education	0.68	1.11	0.82	0.68	0.47	0.57
Physical education	1.11	1.21	0.69	1.11	0.99	0.40
Arts/Music	0.96	1.73	1.52	0.96	0.51	0.84
Foreign languages	1.37	2.32	1.83	1.37	1.10	0.71
Social studies	0.82	1.02	0.73	0.82	0.66	0.49
English/Language arts	0.71	1.13	0.87	0.71	0.44	0.64
Science	0.64	1.43	1.35	0.64	0.53	0.47
Mathematics	0.84	1.20	0.94	0.84	0.56	0.68

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987-88 and 1990-91.

Technical Notes

Introduction

The data for this report were collected on the Public School Teachers Questionnaire, one of the questionnaires comprising the 1987-88 and 1990-91 Schools and Staffing Survey (SASS), surveys sponsored by the U.S. Department of Education's National Center for Education Statistics, and conducted by the U.S. Bureau of the Census. The SASS was a mail survey which collected public and private sector data on the Nation's elementary and secondary teaching force, aspects of teacher supply and demand, teacher workplace conditions, characteristics of school administrators, and school policies and practices. The analyses presented in this paper are based upon a nationally representative sample of 40,593 public school teachers in 1987-88 SASS and 46,705 public school teachers in 1990-91 SASS. The analyses in this report were limited to those teachers who identified themselves as regular, full-time teachers.

Survey response rates

The weighted response rate for the Public School Teacher Questionnaire was 86.4 percent in 1987-88 and 90.3 percent in 1990-91. The weighted response rates were derived by dividing the sum of the basic weights for the interview cases by the sum of the basic weights for the eligible cases. Teacher response rates refer to the percentage of teachers responding in schools that provided teacher lists for sampling. About five percent of the in-scope public schools in both years of SASS did not send in teacher lists.

Item response rates

All of the items used in this analysis had individual item response rates of at least 75% for both 1987-88 and 1990-91.

Effects of item nonresponse

There was no explicit imputation for item nonresponse in the 1987-88 SASS teacher file, but the 1990-91 SASS teacher file was imputed, as described in Volume I of the *1990-91 Schools and Staffing Survey: Data File User's Manual* (NCES 93-144-I). Not imputing for item nonresponse in 1987-88 may lead to a bias in the estimates. In tables which present averages as in this report, the nature of this bias is unknown.

Standard errors

The estimates in these tables are based on samples and are subject to sampling variability. Standard errors were estimated using a balanced repeated replication procedure that incorporates the design features of this complex sample survey. The standard errors provide indications of the accuracy of each estimate. If all possible samples of the same size were surveyed under the same conditions, an interval of 1.96 standard errors below to 1.96 standard errors above a particular statistic would include the universe value in approximately 95 percent of the samples. Note, however, that the standard errors in the tables do not take into account the effects of biases due to item nonresponse, measurement error, data processing error, or other systematic error.

Cautions concerning the measurement of change estimates using 1987-88 and 1990-91 SASS

Care must be taken estimating 1987-88 to 1990-91 change in a SASS data element, because some of the measured change be due to changes in the design of the sample, the format and content of the questionnaires, and other changes. For more information, please refer to section XIII beginning on page 136 of Volume I of the *1990-91 Schools and Staffing Survey: Data File User's Manual* (NCES 93-144-I).

Technical information about the SASS

For more detailed information about the data collection, sample design, file preparation, and estimation procedures, please see the following publications:

Choy, S.P., Medrich, E.A., Henke, R.R., Bobbitt, S.A. *Schools and Staffing in the United States: A Statistical Profile, 1987-88.* National Center for Education Statistics, NCES 92-120.

Choy, S.P., Henke, R.R., Alt, M.N., Medrich, E.A., Bobbitt, S.A. *Schools and Staffing in the United States: A Statistical Profile, 1990-91.* National Center for Education Statistics, NCES 93-146.

Gruber, K.J., Rohr, C.L., Fondelier, S.E. *1990-91 Schools and Staffing Survey: Data File User's Manual. Volume I: Survey Documentation.* National Center for Education Statistics, NCES 93-144-I.

Jabine, T.B. *Quality Profile for SASS, Aspects of the Quality of Data in the Schools and Staffing Survey.* National Center for Education Statistics, NCES 94-340.

Kaufman, S., and Huang, H. *1990-91 Schools and Staffing Survey: Sample Design and Estimation*. National Center for Education Statistics, NCES 93-449.

Kaufman, S. *1988 Schools and Staffing Survey Sample Design and Estimation*. National Center for Education Statistics, NCES 91-127.

Crosswalk between teaching assignments and major/minor fields of study

The following crosswalk shows the major and minor fields that were considered "matches" for the analysis described in this report:

Assignment	*Major/Minor Fields*
Art/Music	Fine and applied arts Art education Music education
Physical education	Health professions Physical education/health education
General elementary, PK, and kindergarten	Elementary education Pre-elementary/early childhood education *Psychology
Foreign language	+Foreign languages *French *German *Latin *Russian *Spanish *Other foreign language Foreign languages education
Vocational education	*Agriculture Agriculture and natural resources Business and management Architecture and environmental design Communications and *Journalism Engineering Agricultural education Business, commerce, and distributive education Home economics education Industrial arts, vocational, and technical education Health professions and *Occupations *Home economics
Social studies	Area and ethnic studies Public affairs and services Economics History

	Political science and government
	Sociology
	Other social sciences
	Psychology
	Social studies/social sciences education
	*American Indian studies (Native American)
	*Indian education (Native American)
Special education	Special education, general
	Emotionally disturbed
	Mentally retarded
	Speech/language impaired
	Deaf and hard-of-hearing
	Visually handicapped
	*Orthopedically impaired
	*Mildly handicapped
	*Severely handicapped
	Specific learning disabilities
	Other special education
Science	Biological/life science
	Chemistry
	Geology/earth science
	Physics
	+Other physical sciences
	+Science education
	*Other natural sciences
	*Agriculture
English/language arts	Letters (english, literature, speech, classics)
	English education
Mathematics	Mathematics
	Mathematics education
	*Engineering

+ These Fields apply to 1987-88 only
* These Fields apply to 1990-91 only

Definition of a teacher

For purposes of this report, a teacher was any full-time regular teacher whose primary assignment was teaching in any teaching in any of grades K-12. Itinerant teachers were not included, nor were long-term substitutes who were filling the role of a regular teacher on an indefinite basis. Teachers classified as secondary teachers had to meet one of the following conditions:

Secondary teachers:

A teacher who checked the "ungraded" option only in the list of grades taught and was designated as a secondary teacher on the list of teachers obtained from each sample school (code "0", "1", or "2" for variable name TSUBJ in the tape documentation).

A teacher who checked 6th grade or lower and 7th grade or higher in the list of grades taught and entered a main assignment code greater than 03 in the main assignment field item.

A teacher who checked 9th grade or higher, or 9th grade or higher and "ungraded".

A teacher who checked 7th and 8th grades only in the list of grades taught and entered a main assignment code of "04" or higher but not special education in the main assignment field.

A teacher who checked 7th and 8th grades only in the list of grades taught and entered a main assignment code of special education in the main assignment field item and was designated as a secondary teacher on the list of teachers obtained from each sample school (code "03" or higher for variable name TSUBJ).

All other teachers who checked 6th grade or lower and 7th grade or higher in the list of grades taught, or 7th and 8th grades only, and were not categorized above as either elementary or secondary.

Acknowledgments

The draft manuscript of this report was reviewed by Susan Ahmed, the Chief Statistician at the National Center for Education Statistics. Ross Merlin of Pinkerton, Inc. consulted in the development of computer programs for the tables. Mary Rollefson and Peter Stowe, of NCES, Jewell Gould, of the American Federation of Teachers, and Richard Ingersoll, of the American Institutes for Research, served as technical reviewers. The authors also appreciate the extensive comments on the manuscript submitted by the Office of the Undersecretary of the U.S. Department of Education.

For more information

For more information about this report, contact Sharon A. Bobbitt, Elementary and Secondary Education Statistics Division, National Center for Education Statistics, U.S. Department of Education, 555 New Jersey Avenue N.W., Washington, D.C., 20208-5651, telephone (202) 219-1461, e-mail "sharon_bobbitt@ed.gov".

☆ U.S. GOVERNMENT PRINTING OFFICE: 1994 - 386-795 - 814/23132

ISBN 0-16-045436-0

9 780160 454363 90000

42

United States
Department of Education
Washington, DC 20208–5651

Official Business
Penalty for Private Use, $300

Postage and Fees Paid
U.S. Department of Education
Permit No. G–17

Third Class